as a cut off for acceptable therapeutic intent. NTCP modeling of radiation induced Liver disease was also performed.

Results: Non-GTV Liver mean dose ranged from 13.1 to 17.0Gy, breaching mandatory trial constraint of <15.2Gy in three cases. NTCP ranged from 0.0 to 0.3 assuming an alpha/beta of 1.0 for normal Liver and negligible assuming alpha/beta of 2.0 or more. At D98%, four sets of contours did not achieve 65Gy BED to gold standard PTV, two sets failing to reach 65Gy BED at D90%.

Conclusion: Significant variability exists in contours drawn by different centers/clinicians in the setting of pre-trial QA to the extent where 10% or more of the PTV receives a BED insufficient for local control in a proportion of cases and NTCP is significantly affected. Given this variability, the pre-trial and on-trial RTTQA process is essential if the effect of contour variability on tumour control rates and treatment toxicity is to be mitigated.

EP-1721

Feature extraction from duodenal dose surface maps to predict toxicity in pancreatic chemoradiation

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Purpose or Objective: To use spatial features from dose surface maps of the duodenum to predict acute duodenal related toxicity in pancreatic chemoradiation.

Material and Methods: Dose surface maps were produced for the duodenum describing the spatial surface dose distribution. Traditional metrics were extracted including mean and max dose, surface area receiving 25, 35, 45 and 55 Gy as absolute and fraction of the surface. Spatial metrics extracted include the length of the duodenum which received less than 25, 35, 45 and 55 Gy to at least 10-90% of the circumference (in 10% intervals). Different thresholds for the length of the duodenum achieving these constraints were tested in order to find the best predictor of toxicity. Toxicity results from 19 patients from the ARCII clinical trial (EudraCT: 2008-006302-42) were used as a proof of concept. 6 and 11 patients had grade (Gr)and Gr ≥2 toxicity respectively.

Results: The best predictors for patients with grade (Gr)≥3 toxicity were at higher doses of 55 Gy. While restricting the dose < 55 Gy to at least 10% of the circumference for at least 10% of the length of the duodenum, or at least 20% of the circumference for at least 20% of the length accurately predicted toxicity for 74% of the patients studied, this only had a sensitivity of 17% and 33% respectively (specificity of 100% and 92%). Figure 1 indicates a better predictor may be restricting dose < 55 Gy to at least 20% of the circumference for at least 70% of the length which, although only accurately predicts toxicity for 58% of the patients, has a sensitivity and specificity of 67% and 54%. It was found that the relative percentage of the circumference spared was a better predictor than absolute circumferential length spared. However, similarly to the spatial metrics, predictions of patients with at least Gr 3 toxicity was seen in the higher dose regions such as mean dose of 60 Gy, maximum dose to a pixel of 62 Gy and when 70% of the surface area receives 55 Gy. Gr 2 toxicity could not be predicted.

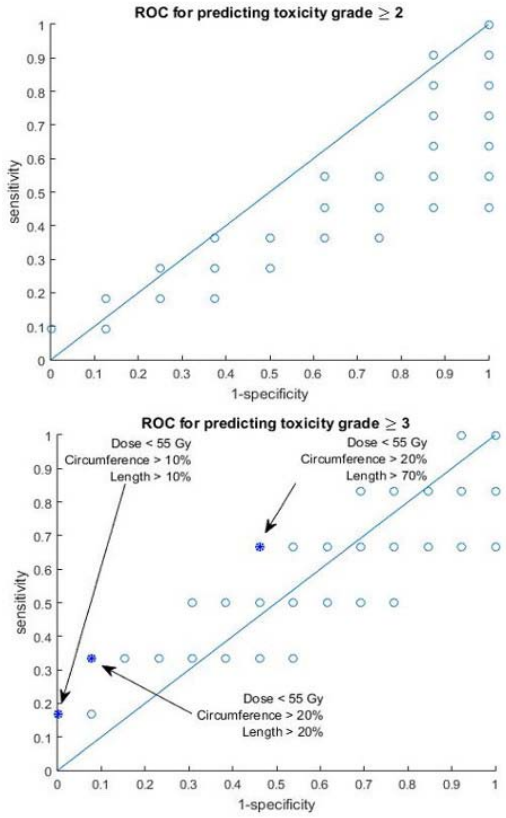

Figure 1: ROCs for grade ≥ 3 and grade ≥ 2 toxicity. Each point represents a different dose-surface feature and threshold that was tested.

Conclusion: In this small sample we have shown that spatial features can be extracted from dose surface maps to aid toxicity prediction, and that high doses to the duodenum appear to be correlated with Gr 3 toxicity. An improved understanding of how these spatial features correlate to toxicity can improve traditional constraints on the duodenum. Further work is required to build a more complete picture of this result, and the analysis will now be extended to a larger patient cohort.

EP-1722

Simulation of the radiation response of a hypoxic prostate tumor in the rat

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Purpose or Objective: In a previous work a model which simulates the radiation response of hypoxic tumors was developed. The task of this work is to validate the model by using preclinical experimental dose response data of rat prostate tumors for single and multiple irradiations.

Material and Methods: The model is voxel-based and simulates the spatio-temporal behavior of tumors considering six radio-biological processes. Important input data are the oxygenation levels of each tumor subvolume at the time of irradiation, which are given as pre-calculated oxygen frequency histograms.The experimental data for validation include growth curves, dose response curves and TCD50s for 1, 2 and 6-fraction (Fx) experiments. A very high α/β value of 84.7 ± 13.8 Gy was determined.A strategy of adjustment was